

Appendix 5.B Speed Limit Reductions in Work Zones

I. Introduction

It is the department's policy to design and operate work zones which minimize the need for and the use of regulatory speed limit reductions ([Executive Order E 1060.00](#)).

A Traffic Management Plan (TMP) is developed for each work zone during the design process. This plan considers strategies and techniques to address specific work zone conditions and traffic control requirements. Design applications that reduce work duration, decrease the number of work stages, and that maintain traffic in long-term work zone configurations can eliminate the need for a regulatory speed limit reduction. Where work zone design applications cannot mitigate the condition, a speed advisory or a variable or continuous speed limit reduction may be considered.

It is important to be consistent in implementing speed limit reductions to maintain credibility with roadway users throughout the state. This appendix includes the work zone speed limit policy and provides guidance to determine the need for a work zone speed limit reduction. Sample speed reduction worksheet, request, and approval documents are included.

A. **Work Zone Speed Limit Reductions.** Following are the speed reduction types and examples of appropriate use:

- **Advisory Speed Reduction** – Where drivers encounter work zone conditions (such as rough road, bump, temporary alignment) that require a specific safe speed message, a sign warning of the actual condition with an appropriate advisory speed is installed.
- **Variable Regulatory Speed Limit Reduction** – Effective where a temporary work zone condition (such as workers on foot close to live traffic or a short-term lane shift) requires a lower operational speed and in place only for the duration of the warranting condition—often a single work shift.
- **Continuous Regulatory Speed Limit Reduction** – A speed reduction effective 24 hours a day for the number of days that work zone conditions warrant, used only where construction elements cannot be mitigated by design elements.

- B. **WSDOT Policy Statement on Reduced Speed Limits in Work Zones.**
Excerpted from Secretary's [Executive Order E 1060.00](#), September 2009:

WSDOT employees are directed to design and operate work zones so that the existing posted speed limit is not reduced. Work zones that have unique design and safety issues that can only be addressed through a speed limit reduction, will be considered for approval and implementation in accordance with this Secretary's Executive Order.

- C. **Rules.** Secretary's [Executive Order E 1060.00](#) (September 2009) Section III, notes the following regarding work zone speed limit reductions:
1. The Regional Administrator approves or denies **all variable speed limit reductions and any continuous regulatory speed limit reduction of 10 mph or less on any route**. This authority may be delegated to the Region Traffic Engineer.
 2. The State Traffic Engineer approves **continuous regulatory speed limit reductions** as follows:
 - Greater than 10 mph on any route.
 - Any reduction to less than 60 mph on freeways.
 - Any reduction in a work zone that is unique or not covered by the Secretary's Executive Order.
 3. The Region Traffic Engineer approves **advisory speed reductions**.
 4. A Traffic Control Plan (TCP) approved by the Region Traffic Engineer, is required for a regulatory speed reduction, and must show locations of existing and proposed speed limit signs, advance warning and speed resumption signs, and any covering or removal of existing speed limit signs.
 5. A Speed Limit Reduction Worksheet ([Figure 5.B-1](#)) approved by the Region Traffic Engineer, is required for any continuous regulatory speed limit reduction.
 6. Notification of all Reduced Regulatory Speed Limits shall be published as required by [RCW 47.48.020](#) ([Figure 5.B-2](#)).
 7. All project specific regulatory and advisory reduced speed limit signing shall be displayed only during the work zone operation that warrants the reduction. All such signs shall be removed or covered when the need for the reduction has ended.

8. When a Region approves a **continuous regulatory speed limit reduction of 10 mph or less**, the Headquarters Traffic Office must be notified. A copy of the approval memo is sufficient. Include copies of the Speed Limit Reduction Worksheet and the TCP.

Notification to HQ is not required for **variable regulatory speed limit reductions, advisory speed reductions, or speed limit reductions allowed by the operational exceptions** described below.

9. Notify the applicable District Office of the Washington State Patrol (WSP) by memorandum of any speed limit reduction. The memo should explain the intended type of reduction with approximate dates, and any plans to coordinate speed enforcement activities. Follow up with specific dates when established.
10. Operational Exceptions are noted in Section III D, which designate speed limit requirements for several unique work zone situations.
 - **Bituminous Surface Treatment (BST/Chip Seal)** work zone speed limits are 35 mph until the roadway is in suitable condition to return to the original speed limit.
 - Speed limits for **temporary roadway alignments** must be consistent with the geometrics of the alignment, as determined by the Regional Traffic Engineer.
 - The design of work zones where **temporary traffic signals** are combined with minimum roadway geometrics and temporary intersections and road approaches, may require a speed limit reduction, which is to be shown on the Traffic Control Plan.
 - **Emergencies** such as natural disasters and long-term incidents within the work zone may require an emergency continuous regulatory speed limit reduction.
 - When work zone conditions leave **workers unprotected** by temporary barrier or truck mounted attenuators, a variable regulatory speed limit may be used as part of a worker safety strategy.

II. Guidance

- A. **Work Zone Assessment.** A Transportation Management Plan (TMP) is developed for each project. It integrates all work zone factors, including traffic speed and volumes, project design, worker exposure, constructability, and traffic operations. Before considering a work zone speed reduction, a work zone impact assessment is conducted which considers, and implements where possible, design strategies that address the specific work zone conditions. **Any decision to implement a reduced speed limit must be assessed and justified as part of the TMP.**

Reduced speed limit boundaries should be set to match the limits of the work zone to which they apply, or for that portion of the work zone where conditions warrant the speed reduction. In general, do not extend the reduced regulatory speed limit beyond the actual work zone limits. However, to avoid abrupt short or inconsistent speed zones, consider extending an adjacent existing lower speed limit boundary to encompass a work zone where the speed limit will be reduced. This can reduce driver confusion about short and different speed zones and improves credibility and compliance with the lowered speed limit.

Worker exposure and driver confusion are common work zone conditions that may be mitigated through effective safety solutions that do not include a speed limit reduction. As part of work zone assessment, consider these and other strategies:

1. **Worker Exposure to Traffic Hazards.** When workers are exposed to live traffic, **do not assume that a lower speed limit will improve worker safety.** Reduce worker exposure and traffic speeds using these effective safety strategies:
 - Use a pilot car for two lane paving operations to effectively control traffic speed past workers.
 - Provide positive protection such as barriers and Truck Mounted Attenuators.
 - Provide a lateral buffer space between workers and live traffic, defined by channelization devices, to allow space for minor traffic intrusions or occasional encroachment by workers. A half to full lane width is an acceptable lateral buffer for high speed conditions.
 - Use closely spaced drums or tall channelizing devices to improve work area separation and motorist guidance.
 - Additional warning devices such as temporary rumble strips, portable changeable message signs, or an automated flagger assistance device may improve flagger protection.
2. **Enhanced Traffic Control.** Driver confusion can be avoided or reduced through the use of enhanced guidance and information. Driver performance is improved by providing concise and accurate messages and visual cues that show the work zone conditions and travel path. Electronic driver feedback signs and occasional enforcement may be used to reinforce the existing speed limit and minimize any traffic speed differential. Before proposing a reduced speed limit, consider the following measures:
 - Remove existing pavement markings that conflict with temporary alignment.
 - Add enhanced pavement markings and traffic control devices.

- Minimize decision point conflicts or confusion.
- Add overhead or other enhanced signing.
- Design effective merge areas.
- Add temporary illumination.

B. **Work Zone Speed Reduction Assessment Factors.** Consider these factors together to determine if a work zone speed limit reduction is needed. If a speed reduction is proposed, note the justifying factors on the Work Zone Speed Reduction Worksheet.

1. Roadway Factors

- Roadway surface is rough, uneven, gravel, has abrupt edges, etc.
- Temporary Concrete Barrier (TCB) is 2 feet or closer to high speed traffic (45 mph or more).
- Traffic lanes are less than 11 feet wide.
- Shoulders are less than 4 feet wide.
- Work zone is in a roadway section with more than two (2) lanes in each direction.
- Work zone elements such as temporary road approaches, intersections, or intersection control (such as a temporary signal) have changed the roadway or roadside environment.
- Work zone has unusual or reduced roadway geometrics such as lane shifts, ramps, and acceleration/deceleration tapers.

2. Operational Factors

- Work zone is on a high speed roadway (existing speed limit above 60 mph).
- Work zone has active operations during hours of darkness.
- Sight distance is restricted due to traffic barriers, temporary alignment, or intersection locations.
- Unprotected work activities or workers are closer than 10 feet to high speed traffic.
- Work zone has detours or alignment changes designed for speeds below the existing limit.

3. Human Factors

When considering a speed limit reduction be aware that drivers generally do not slow down until there is a perceived reason to do so. If motorists do not see the reason for a reduced speed limit, it is often ignored. In addition, note these factors when assessing the need for a speed limit reduction:

- A “Reduced Speed Limit” sign is not automatically noticed or effective in slowing traffic. Most drivers determine their speed by observing visual cues from their surroundings, including the visible work activity, specific warning signs, pavement markings, and other traffic control devices.
- Studies show that drivers slow down more in work zones with PCMS’s, electronic driver feedback signs (“Your Speed Is XX”) and flashing warning lights.
- Most drivers do not voluntarily reduce their speed more than 10 mph unless law enforcement is active.
- Work zone speed limit reductions of more than 10 mph show an increase in crashes due to a wider speed differential between vehicles.

C. **Speed Limit Reduction Assessment Examples.** The following are examples of common work zone situations where a speed limit reduction may be appropriate:

- **Situation: 70 mph Freeway – Long-Term Construction Project**

During work zone operations these projects often have:

- Narrowed or restricted lanes or there are no shoulders.
- Lane shifts and closures.
- Temporary Concrete Barrier 2 feet or less from the lane edge.
- Work operations which create driver distractions.

Consider a Continuous Regulatory Speed Limit Reduction of 10 mph for the above conditions.

- **Situation: 60 mph Two Lane Highway – Paving Project**

During work zone operations these projects often have:

- High worker exposure.
- Limited opportunities to use positive protection such as Temporary Concrete Barrier to protect workers and separate the work operation from traffic.
- Flaggers exposed to high speed traffic.

Consider a variable regulatory speed limit reduction to 40 mph (below the “high speed” 45 mph threshold) for the duration of the work zone operation—often a single shift. *Note that use of a pilot car operation will effectively control traffic speeds through the work zone so a variable speed limit reduction may be unnecessary.*

III. Speed Limit Reduction Approval Process

- A. **Decision Making – Identifying Benefits.** A Continuous or Variable Regulatory Speed Limit Reduction may be justified when the project presents specific safety issues that cannot be addressed through other work zone design or operational options. **When safety benefits can be achieved by applying work zone design standards or other safety enhancements, they are not justification for approval of a speed limit reduction.**

Consider the roadway and operational factors for each project, and understand the human factor that a speed limit reduction may not automatically reduce actual traffic speeds. If factors cannot be mitigated through application of work zone standards, design strategies and features, or other enhancements such as Temporary Concrete Barrier, identify how a speed reduction will provide safety benefits in the following areas and identify the expected safety benefits on the Work Zone Speed Reduction Worksheet.

- **Traffic Safety** – What safety benefit would be provided beyond that realized through standard or enhanced work zone safety and traffic control methods?
- **Worker Safety** – What safety benefit would be provided beyond worker protective equipment or other designed features?
- **ADA, Pedestrian, and Bike Safety** – What safety benefits would be provided for these roadway user groups that cannot be provided in the work zone design and operation?

- B. **Request for Approval Process.** The following are the steps to request a speed limit reduction.

1. The project manager submits a “Speed Reduction Request” to the Regional Administrator, through the Region Traffic Engineer (Figure 5.B-3). The request includes:
 - A completed Work Zone Speed Reduction Worksheet. Specific safety benefits must be identified to warrant approval.
 - The Traffic Control Plan(s) showing all speed limit reduction related details. Example TCPs are shown in Figures 5.B-4a, 5.B-4b, and 5.B-4c.
 - Other supporting documents including the TMP and law enforcement assistance agreements.
2. The Region Traffic Engineer (RTE) reviews the speed limit reduction request to determine if it is warranted.
 - The RTE has the authority to approve advisory speed reductions without further approval by the Regional Administrator.

- For a Variable or Continuous Speed Limit Reduction, the RTE makes a recommendation for approval or denial to the Region Administrator.
3. The Regional Administrator approves or denies the Speed Limit Reduction. Notification of a continuous regulatory speed reduction is sent to the State Traffic Engineer and WSP. Notification to the public is also required per [RCW 47.48.020](#), which states speed reductions must be published in a local newspaper at least three days in advance of the regulation change. The regulation does not take effect without this public notice.
 4. The following speed limit reduction requests are sent to the State Traffic Engineer for approval:
 - Speed Limit reductions of over 10 mph.
 - Speed Limit reductions to less than 60 mph on freeways.
 - Unique requests that are not consistent with WSDOT policy, rules, and guidance.

IV. Summary

WSDOT policy, set by [Executive Order 1060.00](#), is to design work zones that can safely maintain the existing speed limit wherever possible. Work zone conditions that can be mitigated through design or other work zone strategies do not warrant a speed limit reduction.

The need for a speed limit reduction is determined through a work zone assessment, which considers the project roadway and operational factors together with motorist behavior (human factors). Specific safety benefits must be identified to warrant approval of a speed reduction. A work zone assessment may determine that no speed limit reduction is needed, and that implementing design and operational strategies that address the actual work zone conditions is the most effective safety plan.

Speed limit reductions are approved and implemented through a defined process after a work zone assessment determines that a reduction is warranted. Approval authority is based on the type of speed reduction, as noted in the Secretary's [Executive Order 1060.00](#).

Resources

- WSDOT *Traffic Manual* M 51-02
- Revised Code of Washington [RCW 47.48](#)
- WSDOT *Work Zone Traffic Control Guidelines* M 54-44.01
- WSDOT *Design Manual* M 22-01
- WSDOT *Maintenance Manual* M 51-01
- WSDOT *Construction Manual* M 41-01
- Federal Regulations 23 CFR Part 630 Subpart J
- Part VI of the *Manual on Uniform Traffic Control Devices* (MUTCD)
FHWA

Contacts

- Region Traffic Office
- Region Work Zone Specialist
- HQ Traffic Office, Work Zone Team

WORK ZONE SPEED REDUCTION WORKSHEET

(Refer to *Traffic Manual* Chapter 5, Appendix 5B for guidance)

Date: _____ SR: _____ Work Order/Contract Number: _____

Project Name: _____

Existing Conditions

Posted Speed Limit: _____ ADT: _____

Number of lanes: _____ Lane Width: _____ Shoulder Width: _____

Type of Speed Limit Reduction Proposed:

Continuous Variable Advisory

Proposed Speed Limit: _____ Duration for Speed Reduction: _____

Work Operation for proposed reduction: _____

Mile Post Limits for reduction: _____

Work Zone Conditions Specific to Speed Reduction Request:

Traffic Safety Conditions: _____

Worker Safety Conditions: _____

Bicycles, Pedestrians, Others: _____

Work Zone Actions Considered? _____

- Speed Study WSP Enforcement
- Vicinity map and Traffic Control Plan attached

Justification statement for speed reduction:

Project Engineer Concurrence: _____

Comments: _____

Traffic Engineer Concurrence: _____ Disapproval: _____

Comments: _____

Figure 5.B-1.doc

If additional space is necessary for responses, attach a supplemental sheet

Speed Limit Reduction Worksheet
Figure 5.B-1



Transportation Building
310 Maple Park Avenue S.E.
P.O. Box 47300
Olympia, WA 98504-7300
360-705-7000
TTY: 1-800-833-6388
www.wsdot.wa.gov

NOTICE OF SPEED LIMIT REDUCTION

Limits of speed reduction

SR 19 MP 1.67 to MP 9.50 SR 116 MP 2.92 to MP 9.83

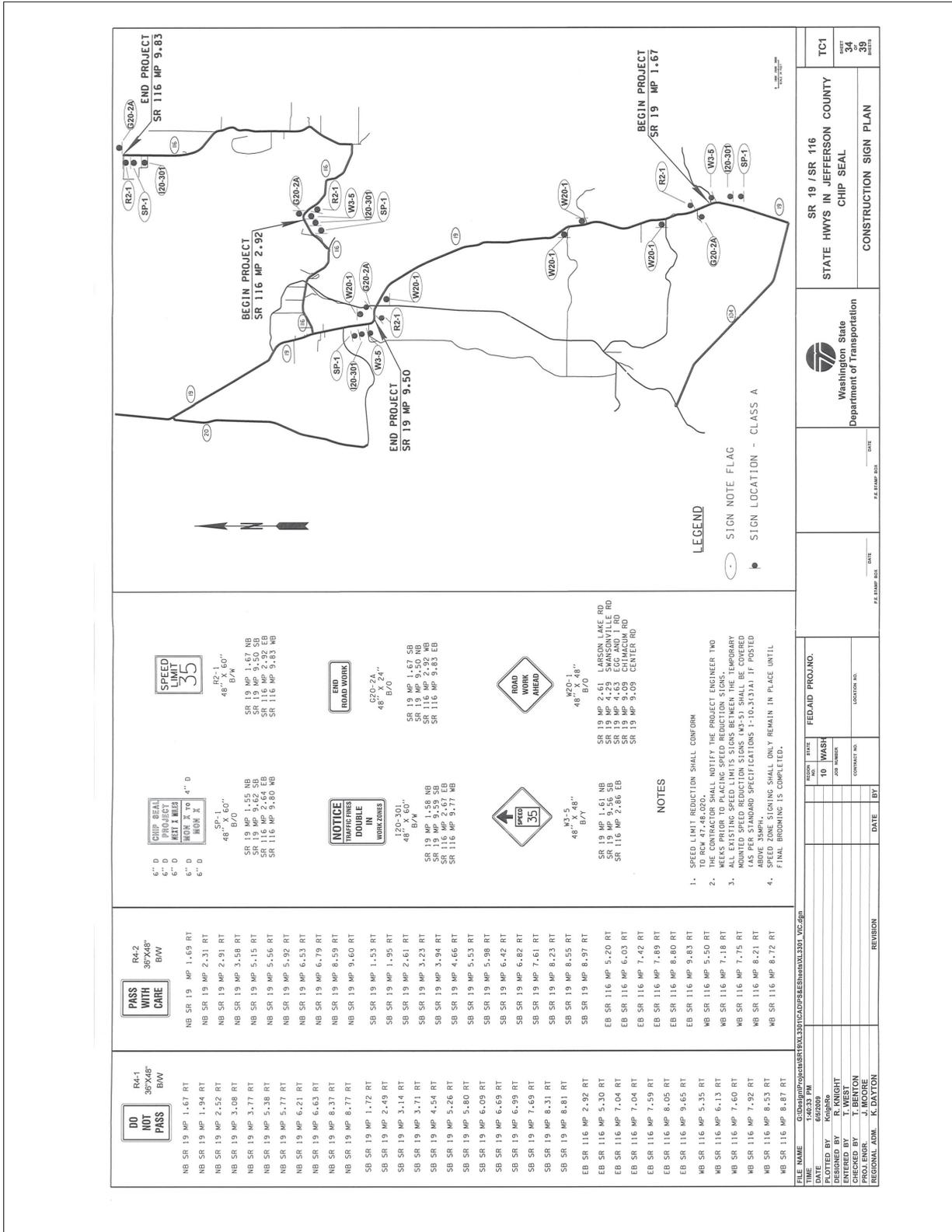
Notice is hereby given by the Washington State Department of Transportation that the posted speed limit of 50 MPH on the above listed route and mile posts will be reduced to a legal speed limit of 35 MPH and will be signed accordingly, beginning June 2009.

This speed reduction is necessary to ensure safe traffic operations during BST paving operations. The legal speed limit will be returned to 50 MPH once final pavement markings are installed.

Washington State Department of Transportation

Kevin Dayton
Olympic Region Administrator

Example Notice of Speed Limit Reduction
Figure 5.B-2



Example Notice of Speed Limit Reduction
Figure 5.B-2 (continued)



Memorandum

Date

EXAMPLETO: *Regional Administrator*THRU: *Regional Traffic Engineer*FROM: *Title/Project manager*SUBJECT: **SR XX Work Zone Speed Limit Reduction**

Per Secretary's Executive Order E 1060.00, we are requesting that the posted regulatory speed limit within the above referenced location be reduced to XX MPH.

This temporary work zone speed limit change is being requested for the following reasons: (list applicable conditions and justification from the Work Zone Speed Limit Reduction Worksheet)

-
-
-

This posted speed reduction will be in effect from *Date to Date*, between *Milepost XX to Milepost XX*. The posted speed reductions will be in effect (*During Actual Work Hours or Continuously*). The dates and the locations may vary based on where the work activities that involve the safety issues listed above are present. (#ask Frank if this sentence is correct?)

Approved:

Date

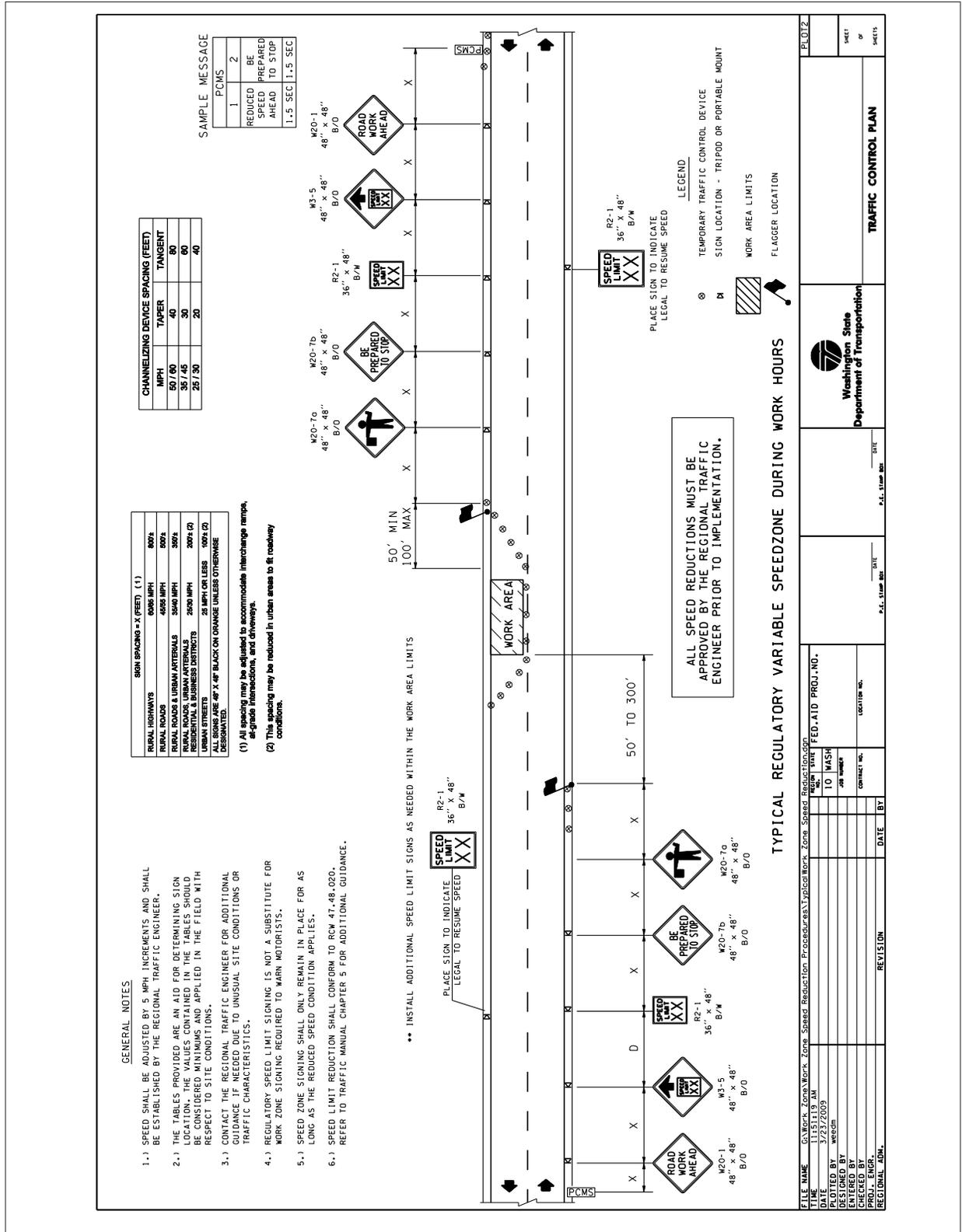
Regional Administrator

cc: State Traffic Engineer
 Area Maintenance Superintendent
 WSP District Captain
 Traffic file
 Contract file

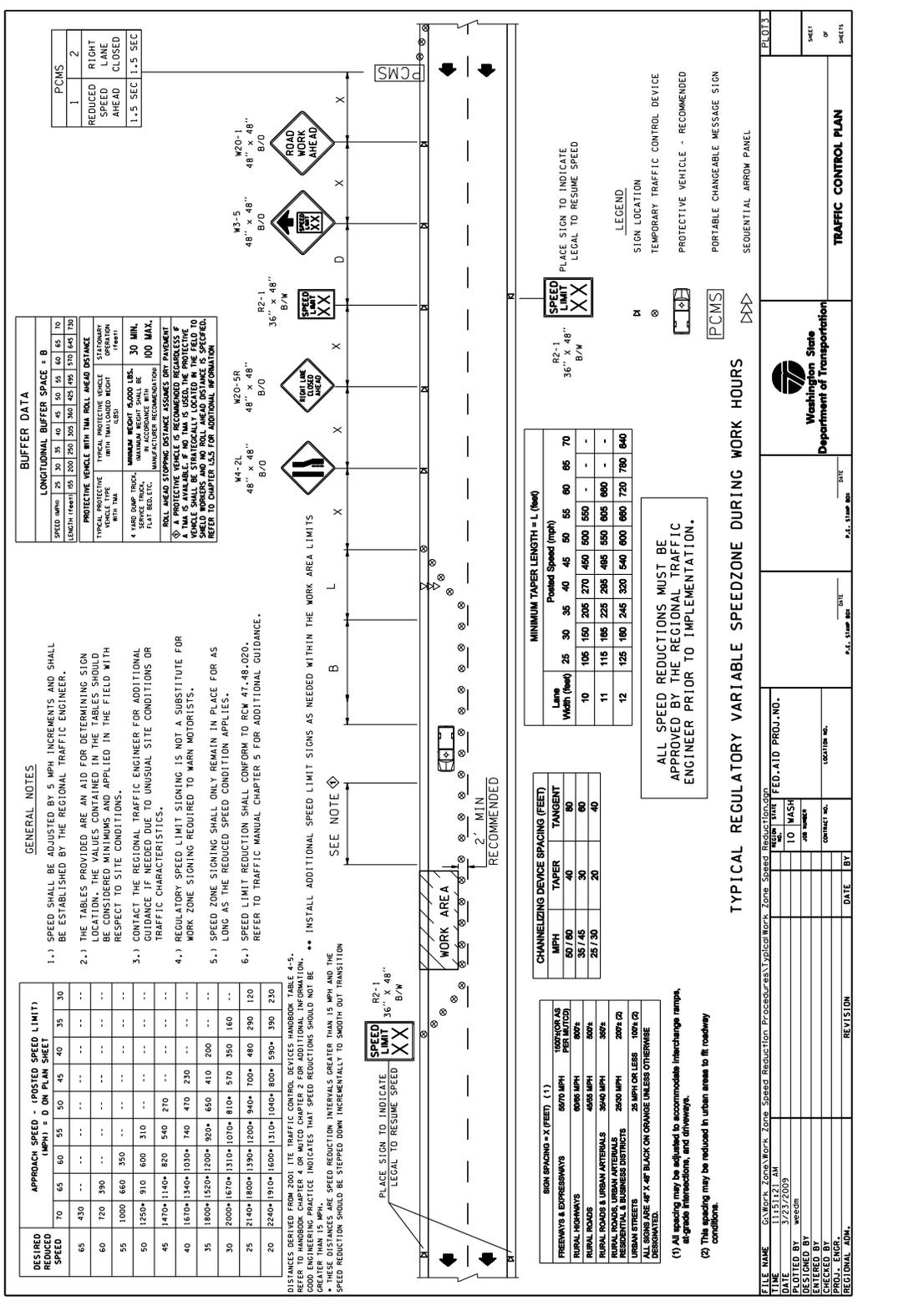
Attachment: Supporting Documents

G:\Engineering Manuals\Traffic Manual\Figure 5.B-3.doc

Speed Reduction Request
Figure 5.B-3



Traffic Control Plan
Figure 5.B-4b



Traffic Control Plan
Figure 5.B-4c